

**Mission: Advance Knowledge and Understanding of the Atmospheres,
of the Earth and Other Planets**

1. INTRODUCTION

The Laboratory for Atmospheres (Code 613) is part of the Earth–Sun Exploration Division (Code 610) under the Sciences and Exploration Directorate (Code 600) based at NASA’s Goddard Space Flight Center in Greenbelt, Maryland.

In line with NASA’s Exploration Initiative, the Laboratory executes a comprehensive research and technology development program dedicated to advancing knowledge and understanding of the atmospheres of the Earth and other planets. The research program is aimed at understanding the influence of solar variability on the Earth’s climate; predicting the weather and climate of the Earth; understanding the structure, dynamics, and radiative properties of precipitation, clouds, and aerosols; understanding atmospheric chemistry, especially the role of natural and anthropogenic trace species on the ozone balance in the stratosphere and the troposphere; and advancing our understanding of physical properties of the Earth’s atmospheres.

The research program identifies problems and requirements for atmospheric observations via satellite missions. Laboratory scientists conceive, design, develop, and implement ultraviolet, infrared, optical, radar, laser, and lidar technology for remote sensing of the atmosphere. Laboratory members conduct field measurements for satellite data calibration and validation, and carry out numerous modeling activities. These models include climate model simulations, modeling the chemistry and transport of trace species on regional to global scales, cloud resolving modes, and developing next-generation Earth system models. Interdisciplinary research is carried out in collaboration with other laboratories and research groups within the new Earth–Sun Exploration Division, as well as across the Sciences and Exploration Directorate.

The Laboratory for Atmospheres is a vital participant in NASA’s research agenda. Our Laboratory often has relatively large programs, sizable satellite missions, or observational campaigns that require the cooperative and collaborative efforts of many scientists. We ensure an appropriate balance between our scientists’ responsibility for these large collaborative projects and their need for an active individual research agenda. This balance allows members of the Laboratory to continuously improve their scientific credentials.

The Laboratory places high importance on promoting and measuring quality in its scientific research. We strive to ensure high quality through peer-review funding processes that support approximately 90% of the work in the Laboratory.

Members of the Laboratory interact with the general public to support a wide range of interests in the atmospheric sciences. Among other activities, the Laboratory raises the public’s awareness of atmospheric science by presenting public lectures and demonstrations, by making scientific data available to wide audiences, by teaching, and by mentoring students and teachers. The Laboratory makes substantial efforts to attract new scientists to the various areas of atmospheric research. We strongly encourage the establishment of partnerships with Federal and state agencies that have operational responsibilities to promote the societal application of our science products.

This report describes our role in NASA’s mission, gives a broad description of our research, and summarizes our scientists’ major accomplishments during calendar year 2005. Please note that any seasonal references refer to those in the Northern Hemisphere. The report also contains useful information on human resources, scientific interactions, and outreach activities. This report is published in a printed version, and an electronic version on our Laboratory for Atmospheres Web site, <http://atmospheres.gsfc.nasa.gov/>.